



اَللّٰهُمَّ صَلِّ وَسَلِّمْ عَلٰى
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**EFFECT OF STORAGE TEMPERATURE IN VARIOUS PROCESSING
TIME ON CYTOMORPHOLOGICAL CHANGES AND CELL COUNT IN
SPUTUM SAMPLES**

By

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DECLARATION

I hereby declare that this is my original work and has not been submitted previously or currently for any other degree at UiTM or any other institutions.

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ABSTRACT

EFFECT OF STORAGE TEMPERATURE IN VARIOUS PROCESSING TIME ON CYTOMORPHOLOGICAL CHANGES AND CELL COUNT IN SPUTUM SAMPLES.

Background: Cytomorphological changes caused by exposure to storage temperature (2-8°C) in sputum samples can impact the interpretation of the laboratory results thus contribute to misdiagnosis in respiratory tract cytology. This study determined the effects of storage temperature in various processing time on the cytomorphology of sputum samples.

Methods: 6 sputum samples were selected from healthy Universiti Teknologi MARA Puncak Alam campus students and sample were collected through deep cough method. Slides were prepared for cell count, Papanicolaou, May grunwald giemsa (MGG), and Gram stains from samples that were exposed to 2-8°C temperature for 0 (control) , 8, 16, and 24 hours and were evaluated for the cytomorphological changes, cell count and bacterial invasion. The finding were observed for nuclear alterations, changes in cytoplasm, bacterial invasion and cell count. Images were captured by using Leica DM 750 microscope equipped with an ICC 50HD camera.

Results: From 8 hours onwards, morphological changes were observed on both nuclear and cytoplasmic, total cell count for delayed processing time in storage temperature in sputum samples showed no significant results ($p < 0.05$) but error bar showed reduction in number of cells, but there is increased in number of bacterial invasion. These provides evidence for the impact of processing time for storage temperature on the quality of sputum samples for cytology.

Conclusion: Cytomorphological changes were observed in sputum samples that were stored in storage temperature. This can impact the laboratory results and lead to misdiagnosis. It is recommended that sputum samples should be immediately process after collection.

Key words: storage temperature, processing time, cytomorphological changes, cell count, sputum sample,

CHAPTER 1

INTRODUCTION

1.1 Background

WHO has stated that the leading causes of cancer in the world is lung cancer with 1.59 million death and was expected to escalate to approximately 70% by the next two decades (W.H.O, 2015) and a study in USA around 2009 also account that lung cancer as the leading cause of cancer death in the united states (Yu et al., 2010) . Mostly, lung cancer was detected at the late stage because of poor in treatment with the overall 5 year survival rate of 15% (Jemal et al., 2007) . In accordance to that, many clinicians has stated that sputum cytology samples are the only non-invasive , cheap and simple test for the early diagnosis of lung cancer (Wu, Wang, Li, Fu, & Han, 2009). Sputum cytology can also help in detecting in the early stage of malignant which then prevent the cancer mortality (Doria-Rose et al., 2009). However, a lot of aspects has been identify that can lead to interpretation errors during the diagnosis process in the laboratory. This include artefacts that resulted from poor sample processing (Orell, 2003), which among them are the morphological changes that occur during many pre and analytical error. However, as many previous study stated about artefacts and morphological changes only a few of these study talked about the effect of the cytomorphology of sputum in expose to storage temperature.

The process of exposure the sputum sample to storage temperature may cause the cytomorphological changes to occur which can contribute to false positive and negative results. It is because, the changes that the samples will undergoes in the time we delaying the diagnosis while exposing it with temperature are still in concern and remain question. The cytomorphological changes that might occur such as vacuolation, micronucleoli and others can lead to pitfalls in cytology interpretation. Moreover in termed as pitfalls, when misinterpretation is occur it can lead to unnecessary treatment, increasing in operating cost and morbidity (Idowu, 2010). In clinical reality for example, samples to be diagnose can be delay in a time before